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1971 Survey for Scleroderris Canker

on the Superior National Forest

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ABSTRACT

A survey for Scleroderris canker, caused by the fungus Scleroderris lagerbergii Gremmen, showed the disease present in 6 of 22 red pine plantations established on the Superior National Forest in 1959 with planting stock from a Michigan nursery. It was present in 1 of 7 established at about the same time with Minnesota stock. Infected plantations were concentrated in the eastern half of the Forest. Within these plantations, disease incidence ranged from 9 to 73 percent.

INTRODUCTION

Scleroderris canker, a tree disease caused by the fungus Scleroderris lagerbergii Gremmen, has seriously damaged many conifer plantations in Europe and North America. The causal fungus was first identified in the United States in Michigan in 1966 (Ohman 1966), but the disease had been present since at least 1951 (Schneider 1961). Scleroderris canker was subsequently found in many red pine (Pinus resinosa Ait.) and jack pine (P. banksiana Lamb.) plantations in northern Wisconsin and Michigan. In 1969, it was discovered in one red pine planting and one red jack pine plantation on the Superior National Forest in Minnesota (Skillings, 1970). A survey of the red pine plantations surrounding the original Minnesota discoveries was made in 1970 (O'Brien 1971). Planting records showed that at least one plantation included in the 1970 survey was established with seedlings from Upper Michigan, and that elsewhere on the Forest several others had been planted with stock from this source in the year 1959. It is believed that Scleroderris canker has been spread throughout the Lake States primarily through the use of infected stock. Therefore, it seemed that it would be most productive to concentrate survey efforts on plantations in which the disease was most likely to be found, i.e. those established with Michigan stock. A 1971 survey was designed to include all plantations on the entire Forest established with 3-0 or 2-1 Michigan stock. In addition to better ascertaining the distribution of the disease on the Forest and the damage it has caused, it was hoped the survey would provide conclusive evidence as to the original source of infection.

METHODS

A total of 22 plantations on the Forest established with 3-0 or 2-1 Michigan stock in the year 1959 were surveyed. Two plantations could not be located. There is some uncertainty about the source of the stock on the Virginia District, but it was probably Michigan. For comparison, 7 plantations established at about the same time with Minnesota stock were also surveyed.

Each plantation was first inspected to determine if *Scleroderris* infection was present. Trees in the lowest topographical areas in the plantations, where infection is most likely to be found, were examined for symptoms (dead branches). A plantation was considered not infected if the characteristic yellow-green discoloration of the wood beneath the bark of dead branches was not found on any of the first 50 trees examined.

To estimate tree mortality and extent of infection in those stands where infection was found, a form of the "nearest neighbor technique" was used. Straight lines, their locations selected subjectively with an attempt at a representative sample, were run across each plantation. Sampling points were established at one-chain intervals along these lines, and the nearest tree (of any species) to each point was located and its nearest neighboring red pine was examined for infection. On the Gunflint District, jack pine was also examined in this manner. The number of trees examined averaged about 50 per plantation, or 1.5 trees/acre.

RESULTS

Scleroderris canker was found in 6 of the 22 plantations established with Michigan stock (another was suspect), and in 1 of 7 established with Minnesota stock (Table 1). In the latter case, 2 infected trees were found. In the plantations established with Michigan stock, infection ranged from 9 to 73 percent, and tree mortality apparently due to the disease, from 2 to 7 percent. Infected jack pine was found in only one plantation. The infected plantations are concentrated in the eastern part of the Forest (Figure 1). Coincidentally, tree mortality was more common in some of the plantations which were not found infected with *Scleroderris* canker. Most of this mortality was apparently caused by Armillaria mellea, the root rot fungus.

District	Plantation Location	Acres	Source of Stock (Red Pine Only)		Infection Found		Trees Examined	Percent of Trees Infected		Percent of Trees Dead	
			Michigan	Minnesota	Yes	No		Red Pine	Jack Pine	Total	Infected
Gunflint	T64 R1E S32	56	x		x		49	73	0	4	4
	T63 R1W S11&14	32	x		x		61	43	33	8	7
	T63 R1E S14	40	x		x		Not Surveyed*			-	-
	T64 R1E S32	15	x		x			21	0	3	3
	T63 R1W S10&15	28	x		x			35	0	6	3
	T64 R1W S13&14										
	23&24	126		x		x	111	0	0	5	0
	T63 R2E S3,4,9	105		x	x		114	1	0	4	0
Isabella	T60 R7W S2&3	37	x			x	35	0	-	26	0
	T61 R7W S34&20	189	x			x	48	0	-	6	0
	T60 R7W S20,21&29	159	x		x		79	11	-	10	2
	T60 R8W S8&9	68	x			x	32	0	-	19	0
	T60 R8W S23&24	105	x			x	55	0	-	9	0
	T61 R8W S34&35	20	x			x	33	0	-	6	0
	T60 R8W S8	87		x		x	-	0	-	-	-
	T61 R8W S33&34	87		x		x	-	0	-	-	-
Halfway	T63 R6W S27	500	x			x	187	0	-	3	0
	T61 R9W S10	25	x			x	85	0	-	15	0
	T61 R11W										
	S27,28,33&34	228	x			x	55	0	-	24	0
	T62 R10W										
	S10&20	17	x			x	37	0	-	0	0
	T62 R10W										
	S21	35	x			x	62	0	-	9	0
	T61 R9W S19	8	x			x	22	0	-	0	0
	T61 R9W S20,29&30	-		x		x	85	0	-	21	0
	T60 R10W S1	-		x		x	58	0	-	0	0
Virginia	T60 R18W S21	4	Prob.			x	12	0	-	0	0
	T60 R19W S29	4	"			Poss.	16	1?	-	19	1?
	T59 R19W S6	10	"			x	17	0	-	18	0
	T60 R20W S25	8	"			x	30	0	-	13	0
	T60 R20W S14	24		x		x	30	0	-	23	0
Aurora	T58 R13W S24	9	Prob.			x	-	0	-	-	-

* Surviving trees too scattered.

Table 1. Plantations surveyed for Scleroderris canker, 1971.

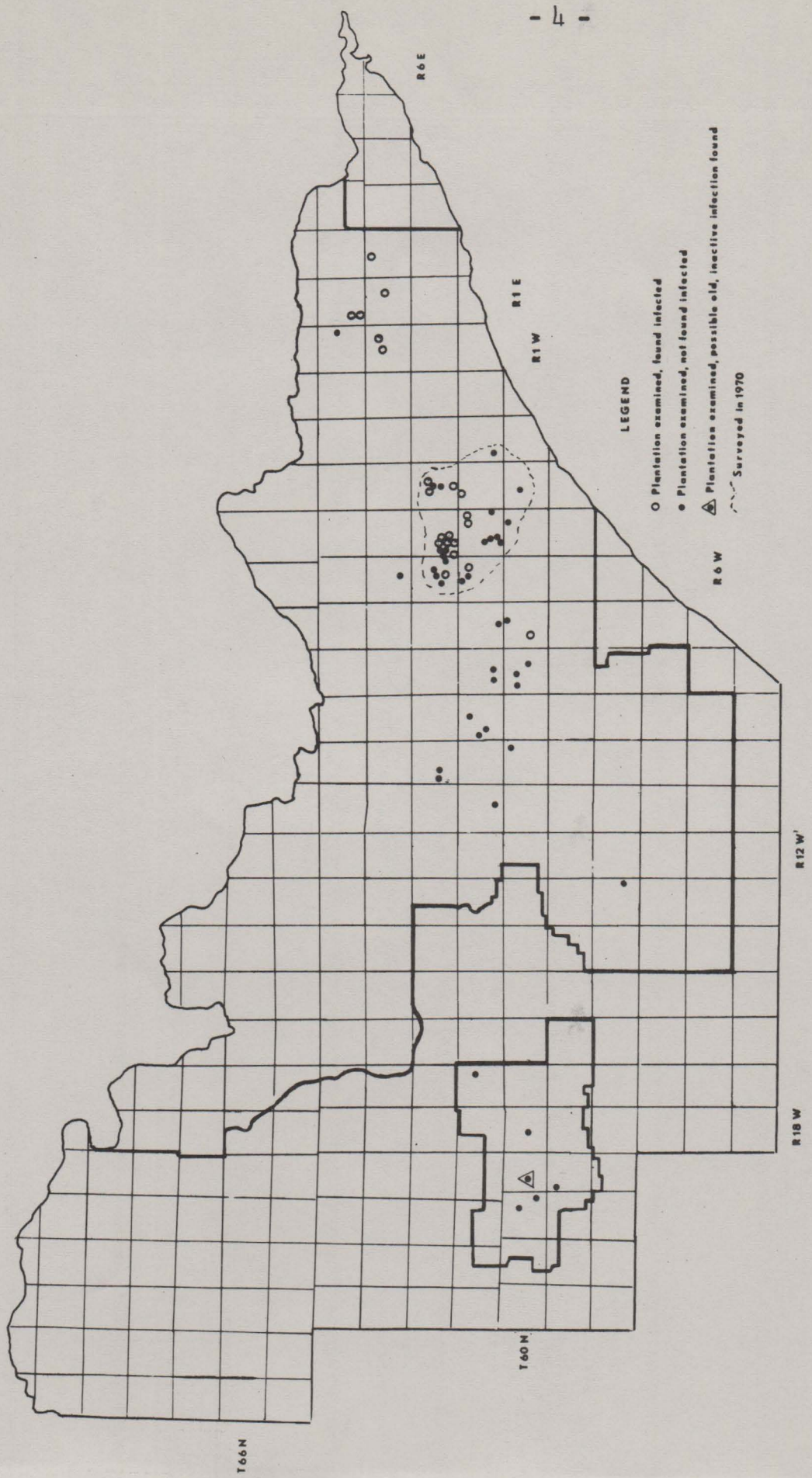


Figure 1. Plantations surveyed for Scleroderma canker, 1971.

CONCLUSIONS

There are at least two ways that *Scleroderris* canker could have been introduced to the Superior National Forest. Infection could have been present in the planting stock, or spores of the fungus could have been carried by the wind from sources in neighboring Ontario or across Lake Superior from sources in Wisconsin. If it were known which means was responsible, forest managers would have some indication of the capability of the fungus to spread in this area. Unfortunately, the survey did not definitely settle the question. True, only 1 of the 7 plantations of Minnesota stock was infected (if the Tofte plantations surveyed in 1970 are not considered) compared to 6 of the 22 of Michigan stock. And one badly decayed tree was found on the Virginia District, on the western edge of the forest, that had a canker that looked like a *Scleroderris* canker. Possibly the fact that infection is concentrated nearest Ontario and Wisconsin is due to the grouping of stock from a particular nursery bed. It is also possible that infection came from both sources.

Whatever the original source of *S. lagerbergii*, environmental conditions in northern Minnesota are apparently very suitable for the fungus. Within most infected plantations, there is a high incidence of the disease.

LITERATURE CITED

- O'Brien, James T. Survey for *Scleroderris* canker on the Tofte District of the Superior National Forest. Rpt. No. S-71-1 (available from St. Paul Field Office).
- Ohman, John H. 1966. *Scleroderris lagerbergii* Gremmen: The cause of dieback and mortality of red and jack pines in Upper Michigan plantations. Plant Disease Reporter 50: 402-405.
- Schneider, Howard W. 1961. The X disease of red pine plantations. Status report, Ottawa National Forest. Unpublished report on file in Supervisor's office, Ottawa NF, Ironwood, Michigan.
- Skilling, D.D. 1970. *Scleroderris* canker on red and jack pine in Minnesota. Plant Disease Reporter 54: 132.